Distribution of Planktonic Malacostraca and Cephalopod Paralarvae in the South China Sea, Area III: Western Philippines

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ABSTRACT

Zooplankton samples from 31 stations in the western Philippines water were collected by M.V. SEAFDEC on 7 April – 19 May 1998. Six major groups were identified: Euphausiacea, Natantia (Penaeidea and Caridea), Reptantia, Brachyura, Stomatopoda and cephalopod paralarvae. Three genera of Euphausiacea were found, they belong to one family: this group formed 25.1% - 90.9% of total taxonomic groups at different stations. The superfamily Penaeidea consisted of seven genera belong to four families. Caridea larvae were composed of 11 families including 19 genera. Retantia consisted of three infraorder: Stenopodidea, Thalassinidea and Parinuridea. The infraorder Parinuridea comprised two families: Palinulidae and Scyllaridae. Fourteen families of Brachyura larvae occurred in the study area. Stomatopoda was composed of three families including three genera. Cephalopoda paralarvae were presented in the plankton samples by six families representing eight genera. The maximum counts for malacostraca larvae and cephalopod paralarvae was observed at station 16. The present study reveals that some economic species such as *Penaeus* spp., *Parapenaeus* spp., *Panulirus* spp., *Scyllarus* spp., *Portunus* spp. and *Sthenoteuthis oualaniensis* were important components of the zooplankton assemblages in the western Philippines.

Key words: Euphausiacea, shrimp, Brachyura, phyllosoma, Stomatopoda, cephalopod, larvae, zooplankton

Introduction

Malacostraca larvae consist of seven major groups: Stomatopoda, Natantia(Penaeidea and Caridea), Reptantia, Anomura, Brachyura, Mysidacea and Euphausiacea. Despite their commercial importance, our knowledge of malacostraca larvae and cephalopod paralarvae from the Philippines waters is based mainly on general groups. The main objective of the present study is investigating the distribution, abundance and diversity information of some malacostraca larvae and cephalopod paralarvae from the western Philippines water and consideration of reproduction of these groups.

Materials and Methods

Zooplankton samples from 31 stations in the western Philippines water were collected by M.V. SEAFDEC on 7 April – 19 May 1998 (Table 1 & Fig. 1). Zooplankton was collected using 0.33 mm mesh net attached to 60 cm. diameter bongo frames. A flowmeter, attached within the

aperture of the net, measured the amount of water filtered. At each station, a 30 minutes oblique tow of the bongo net was made with the ship speed was about 2 knots. The depth of the haul was 60 meters below the sea surface. Samples were preserved in 10 % buffered formalin-seawater immediately. In the laboratory, Euphausiacea, Natantia (Penaeidea and Caridea), Reptantia, Brachyura, Stomatopoda and cephalopod paralarvae were sorted out and identified to genus level.

The classification of Euphausiacea was based on Brinton (1975). The classification of shrimp larvae was based on Broad (1957), Cook (1965), Dobkin (1963), Gurney (1942), Heegaard (1966), Holthuis (1993), Kurata (1968), Kurata and Vanithchkul (1974), Paulinose (1979) and Williamson (1957, 1960, 1962, 1967[1], 1967[2], 1970 and 1976). The classification of phyllosoma larvae was based on Johnson (1971) and Radhakrishnan and Vijayakumaran (1993). The classification of Brachyura larvae was based on Rice (1980). The classification of stomatopod larvae was based on Dakin and Colefax (1940), Diaz (1998), Manning (1963) and Michel and Manning (1972). The classification of cephalopod paralarvae was based on Kubodera and Okutani (1981), Okutani (1966 and 1968), Okutani and Mc Gowan (1969), Sweeney *et al* (1992), Tsuchiya *et al* (1991), Yamamoto and Okutani (1975) and Young and Harman (1985).

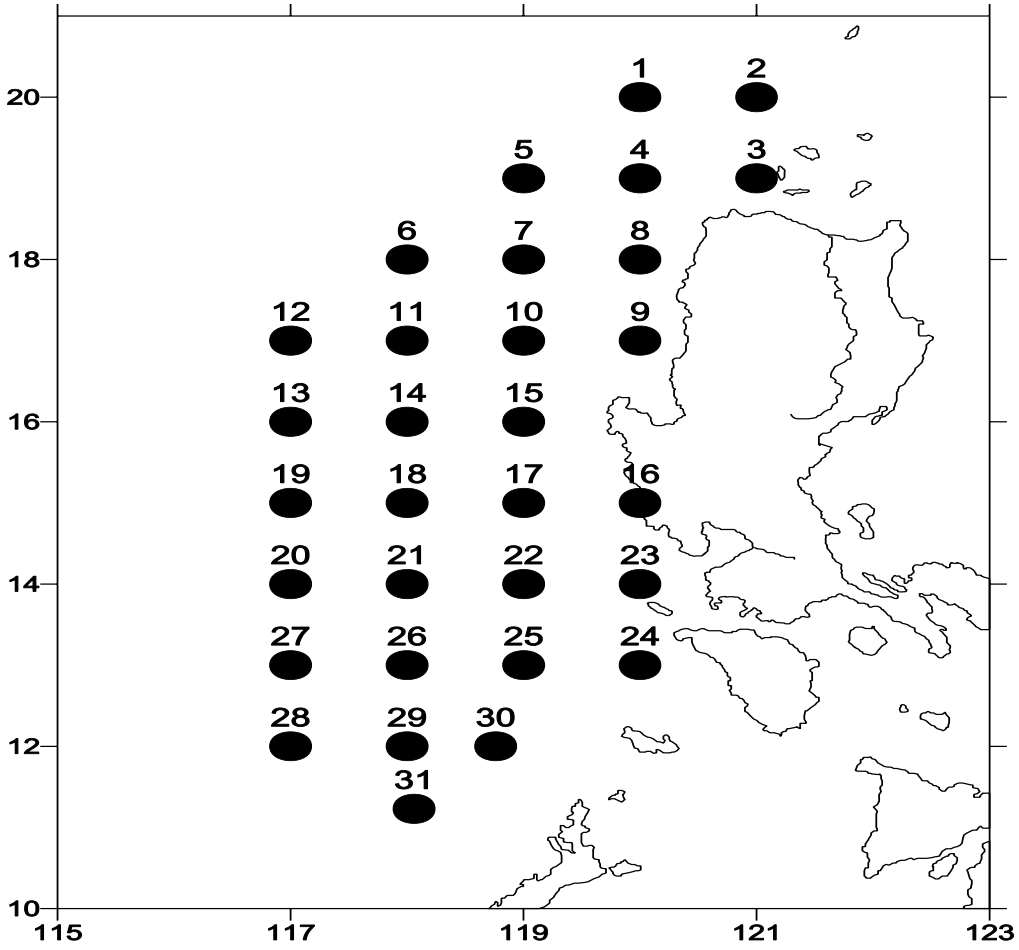

Fig. 1. Map of sampling stations in the western Philippines.

Table 1. Partial details of sampling stations

Station No.	Date	Local Time	Position Latitude	Longitude	Depth (m)
1	18-Apr-98	0700-0735	19˚59.2 N	119˚58.7 E	3620
2	18-Apr-98	2015-2044	20˚00.0 N	121˚00.2 E	1434
3	19-Apr-98	0431-0501	19˚01.5 N	121˚00.4 E	2565
4	19-Apr-98	1248-1316	19˚00.2 N	120˚00.4 E	1100
5	20-Apr-98	0708-0735	19˚00.2 N	120˚04.0 E	3820
6	21-Apr-98	2355-0024	18˚00.0 N	118˚00.0 E	1830
7	21-Apr-98	2024-2051	18˚00.3 N	119˚00.2 E	1180
8	22-Apr-98	0922-0949	18˚00.0 N	120˚00.0 E	2932
9	22-Apr-98	1615-1722	17˚00.0 N	120˚00.0 E	1505
10	25-Apr-98	0201-0230	17˚00.0 N	119˚00.0 E	1851
11	25-Apr-98	0922-0950	17˚00.0 N	118˚00.0 E	3967
12	25-Apr-98	1658-1727	17˚00.0 N	117˚00.0 E	4031
13	26-Apr-98	2043-2106	16˚00.3 N	117˚00.6 E	4113
14	27-Apr-98	0716-0735	16˚00.4 N	118˚00.7 E	4041
15	28-Apr-98	0604-0634	16˚01.3 N	119˚00.35 E	3646
16	28-Apr-98	1609-1639	15˚01.3 N	120˚00.4 E	59
17	29-Apr-98	0645-0616	15˚00.4 N	118˚57.4 E	4559
18	29-Apr-98	2017-2035	15˚00.0 N	117˚59.9 E	937
19	30-Apr-98	0327-0357	14˚59.6 N	116˚59.3 E	1206
20	30-Apr-98	1114-1145	14˚00.2 N	116˚59.5 E	1674
21	1-May-98	0546-0617	14˚04.2 N	117˚57.7 E	1777
22	1-May-98	2058-2027	14˚00.3 N	118˚59.9 E	1800
23	2-May-98	0430-0500	14˚01.6 N	119˚59.9 E	2185
24	4-May-98	1557-1627	13˚00.7 N	119˚58.6 E	710
25	5-May-98	2337-0006	12˚59.8 N	118˚59.0 E	440
26	5-May-98	0715-0734	13˚00.2 N	117˚58.9 E	822
27	5-May-98	1441-1510	13˚01.3 N	116˚59.1 E	1672
28	6-May-98	2033-2102	12˚00.34 N	116˚59.57 E	3810
29	7-May-98	0540-0611	12˚01.6 N	118˚00.0 E	1143
30	8-May-98	0608-0639	11˚59.9 N	118˚45.6 E	1922
31	9-May-98	0603-0636	11˚13.5 N	118˚03.1 E	544

Results

Distribution and abundance

Distribution and abundance of Euphausiacea, shrimp larvae, phyllosoma larvae, brachyura larvae, Stomatopoda larvae and cephalopod paralarvae were shown in Fig. 2-7.

Species composition

Cephalopoda and five major groups of malacostraca were identified. A total of Euphausiacea, Natantia, Reptantia, Brachyura, Stomatopoda and Cephalopoda representing 37 genera and 2 species was identified as shown in Table 2.

Euphausiacea

Euphausiacea composed of one family and three genera: *Thysanopoda tricuspidata*, *Euphausia* spp. and *Stylocheiron* spp. Abundance of Euphausiacea varies extensively; ranging from 500 - 17,197 individual/1000m^3. It showed highest concentration at station 23 (Table 3). Euphausiacea formed 25.1 % - 90.9 % of total taxonomic groups at different stations and was the most dominant component of the malacostraca and cephalopod larvae recorded (Table 10).

Penaeidea

The superfamily Penaeidea consisted of four families: Solenoceridae, Aristeidae, Penaeidae and Sergestidae. Family Solenoceridae was represented by only one genus *Solenocera* spp. This genus was found only at four stations in low density (3-270 individual/1000m^3). Family Aristeidae was found only one genus *Gennadas* spp. It occurred at all stations except station 18, but showed highest density at station 16 (216 individual/1000m^3). Family Penaidae was represented by *Penaeus* spp. and *Parapenaeus* spp. *Penaeus* spp. occurred at three stations (station 2, 23 and 25) and low number (2-3 individual/1000m^3). *Parapenaeus* spp. appeared at many stations that the highest concentration was at station 16 (216 individual/1000m^3). Family Sergestidae was represented by *Sergestes* spp., *Sergia* spp. and *Lucifer* spp. *Sergestes* spp. were found all over the studied area except station 28. The highest density occurred at station 5 (374 individual/1000m^3). *Sergia* spp. appeared in low number at station 6 and 7. *Lucifer* spp. were very common and formed 91 % of Penaeidea larvae. The highest density occurred at station 7 (4,388 individual/1000m^3). Abundance of Penaeidea varied from 288-4,851 individual/1000m^3. The highest concentration of Penaeidea larvae was at station 16 (Table 4). It formed 3.4% - 73.2% of all groups at different stations (Table 10).

Caridea

This group was composed of 12 families: Pasiphaeidae, Oplophoridae, Nematocarcinidae, Rhynchocinetidae, Anchistiodidae, Palaemonidae, Alphaeidae, Hippolytidae, Processidae, Pandalidae, Thalassocarididae and Amphionidae. The family Passiphaeidae was represented by *Leptochela* spp., which was found in most stations. The highest density was at station 23 with 966 individual/1000m^3. The family Oplophoridae, Nematocarcinidae and Processidae could not identified to genus level and densities of these families (in total) were only 3, 136 and 23 individual/1000m^3 respectively. The family Rhynchocinetidae was expressed by *Rhynchocinetes* spp. which was recorded in many stations but in low number (2-18 individual/1000m^3). The family Anchistiodidae was represented by *Anchistiodes* spp. This species was rare that found only at one station (3 individual/1000m^3). The family Palaemonidae was represented by two subfamilies:

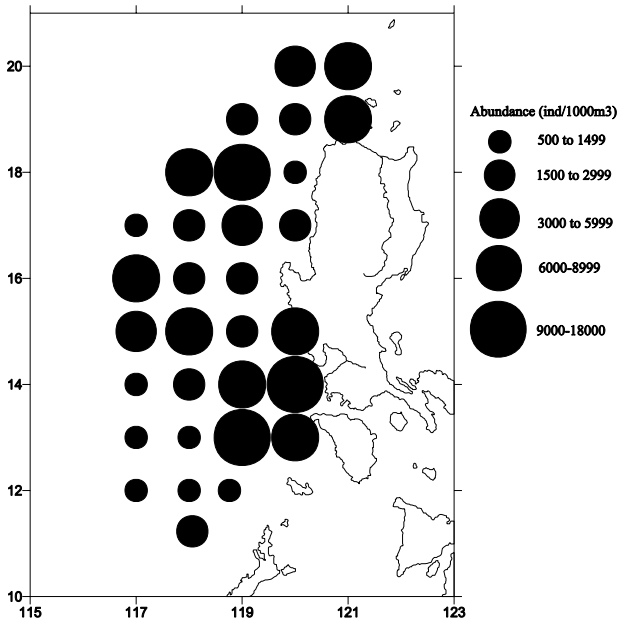

Fig. 2. Distribution and abundance of Euphausiacea in the western Philippines.

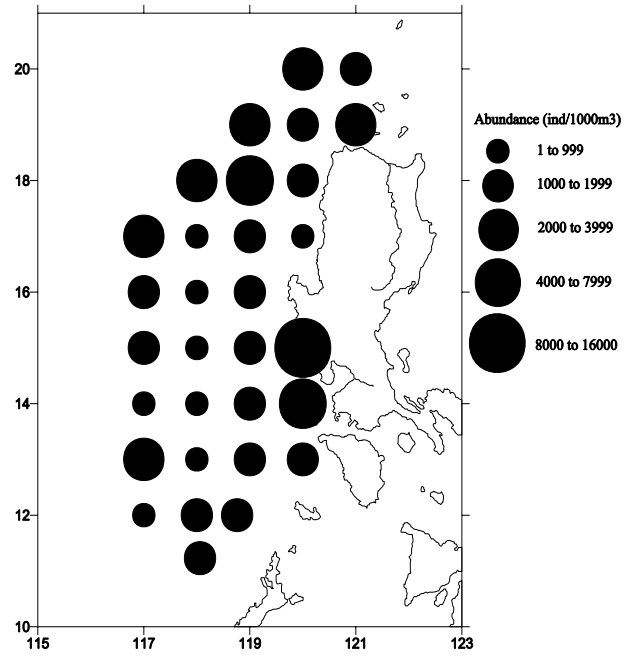

Fig. 3. Distribution and abundance of shrimp larvae in the western Philippines

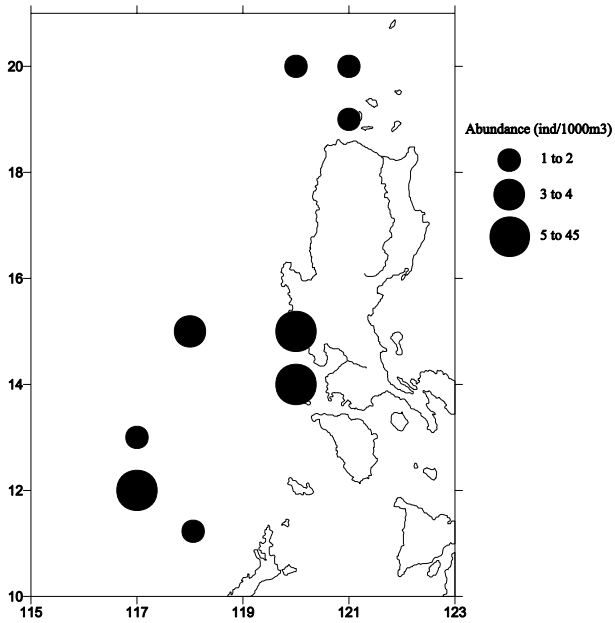

Fig. 4. Distribution and abundance of phyllosoma larvae in the western Philippines.

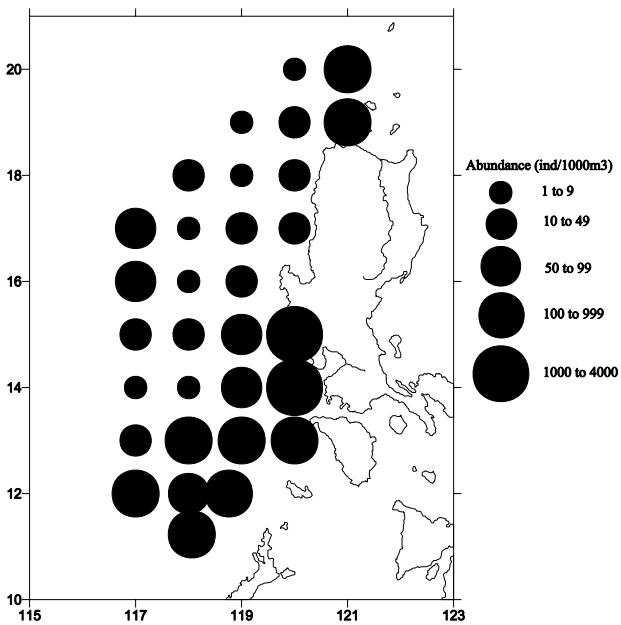

Fig. 5. Distribution and abundance of Brachyura larvae in the western Philippines

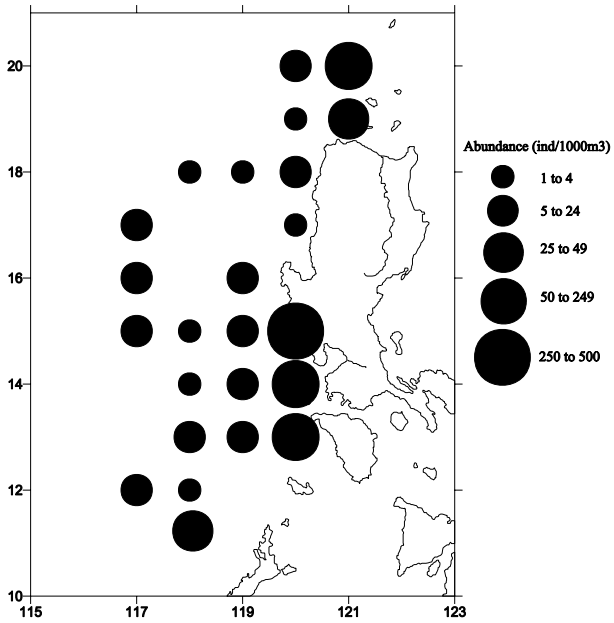

Fig. 6. Distribution and abundance of Stomatopod larvae in the western Philippines.

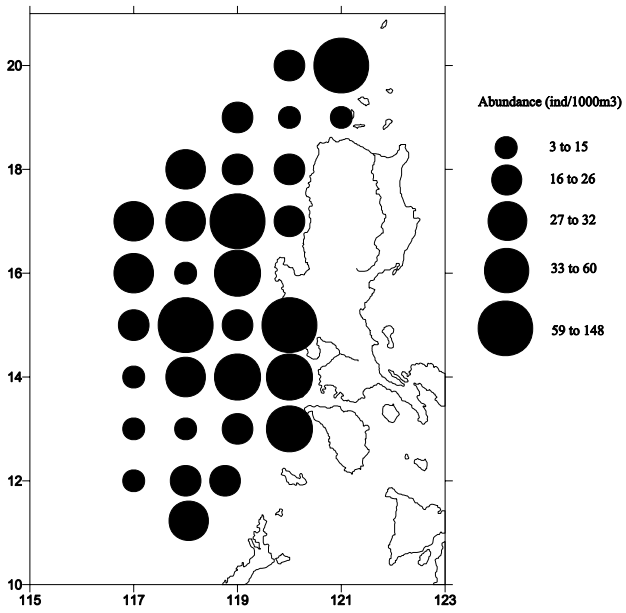

Fig. 7. Distribution and abundance of Cephalopod paralarvae in the western Philippines.

Palaemoninae and Pontaniinae. Subfamily Palaemoninae was expressed by *Palaemonetes* spp., *Retrocaris* spp., Palaemonid sp. 1, Palaemonid sp. 2 and Palaemonid sp. 3. Only Palaemonid sp. 2 occurred in many stations, the highest concentration was in station 16 (974 individual/1000m^3). While the other two species were rare in this study area. Subfamily: Pontoniinae was represented by *Mesocaris* spp. *Periclimenes* spp. and Pontoid larvae sp. 1. Both genera was found at all area that the highest density was recorded at station 16 (72 and 4093 individual/1000m^3 respectively).

The family Alphaeidae was represented by only one genus *Alpheus*. *Alpheus* spp. were found in the whole area in this study. The highest concentration of this genus occurred at station 16 (3,029 individual/1000m^3). The genus *Lysmata* of the family Hippolytidae was presented in many stations. The highest density was at station 16 with 343 individual/1000m^3. The family Pandalidae was represented at least three genera: *Heterocarpus* spp*, Plesionika* spp., *Stylopandalus* spp. and pandalid larvae sp. 1-5. Pandalidae was found in many stations but in low number. *Thalassocaris* spp. of the family Thalassocarididae was recorded at all stations except station 6 and 8. The highest density was at station 16 with 974 individual/1000m^3. *Amphion* spp. of the family Amphionidae occurred in some station in few numbers. Abundance of Caridea varied from 3-10,154 individual/1000m^3. The highest concentration of these larvae was at station 16 (Table 5). This group formed 0.2% - 36.8% of all groups at different stations (Table 10).

Reptantia

This group consisted of three infraorder: Stenopodidea, Thalassinidea and Parinuridea. The infraorder Stenopodidea was found only one family (Stenopodidae) and one genus (*Stenopus* spp.). This species appeared in many stations but in small numbers. The highest concentration of these larvae was at station 16 with 72 individual/1000m^3. The infraorder Thalassinidea could not identified to family level. Thalassinid larvae was found at two stations. It was very rare that occurred 0%-0.7% of all groups at different stations. The infraorder Palinuridea comprised two

Table 2 Taxonomic list of malacostraca larvae and cephalopod paralarvae in the western Philippines water during the period from 7 April – 19 May 1998 and frequency of occurrence: R= rare, average abundance < 10 ind. /1000m^3 , C = common , average abundance 10-100 ind./1000m^3 , VC=very common, average abundance > 100 ind./ 1000m^3

Taxonomic list	frequency of occurrence	Taxonomic list	frequency of occurrence
Euphausiacea		Macruma (Reptantia)	
Family: Euphausiidae		Stenopodidea	
Thysanopoda tricuspidata	*VC*	Family: Stenopodidae	
Euphausia spp.	VC	*Stenopus* spp.	R
Stylocheiron spp.	VC	Thalassinidea	
Macrura (Natantia)		Thalassinid larvae	R
Penaeidea		Palinuridea	
Family: Solenoceridae		Family: Palinuridae	
Solencera spp.	R	*Panulirus* spp.	R
Family: Aristeidae		Family: Scyllaridae	
Gennadas spp.	R	*Scyllarus* spp.	R
Family: Penaeidae		Brachyura	
Protozoea stage	R	Family: Dromiidae	R
Penaeus spp.	C	Family: Homolidae	R
Parapenaeus spp.	C	Family: Dorippidae	R
Family: Sergestidae		Family: Calappidae	R
Sergestes spp.	C	Family: Leucosiidae	R
Sergia spp.	R	Family: Raninidae	R
Lucifer spp.	VC	Family: Majidae	C
Caridea		Family: Parthenopidae	C
Family: Passiphaeidae		Family: Hymenosomatidae	C
Leptochela spp.	*VC*	Family: Corystidae	R
Family: Oplophoridae	R	Family: Cancridae	R
Family: Nematocarcinidae	R	Family: Portunidae	
Family: Rhynchocinetidae		*Portunus* spp.	VC
Rhynchocinetes spp.	R	Family: Xanthidae	C
Family: Anchistioididae		Family: Grapsidae	R
Anchistioides spp.	R	Stomatopoda	
Family: Palaemonidae		Family: Lysiosquilla	
Subfamily: Palaemoninae		*Lysiosquilla* spp.	R
Palaemonetes spp.	R	Family: Squillidae	
Retrocaris spp.	R	*Squilla* spp.	C
Subfamily: Pontoniinae		Family: Gonodactylidae	
Mesocaris spp.	C	*Gonodactylus* spp.	R
Periclimenes spp.	VC	Cephalopoda	
Family: Alphaeidae		Family: Enoploteuthidae	
Alpheus spp.	VC	*Enoploteuthis* spp.	C
Family: Hippolytidae		*Abralia* spp.	R
Lysmata spp.	C	Family: Ommastrepidae	
Family: Processidae	R	*Sthenoteuthis oualaniensis*	C
Family: Pandalidae		Family: Onychoteuthidae	
Heterocarpus spp.	R	*Onychoteuthis* spp.	R
Plesionika spp.	R	Family: Brachioteuthidae	
Stylopandalus spp.	R	*Brachioteuthis* spp.	R
Family: Thalassocarididae		Family: Cranchidae	
Thalassocaris spp.	C	Liocranchia spp.	R
Family: Amphionidae		*Leachia* spp.	R
Amphion spp.	R	Family: Octopodidae	

Table 3 Numbers of Euphausiacea (Family Euphausidae) per 1000 m^3 at 31 stations in the western Philippines water, during 7 April- 19 May 1998.

	Stations															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Thysanopoda tricuspidata	424	306	96	0	16	32	157	0	0	225	7	50	657	153	138	111
Euphausiacea spp.	0	5870	2909	7	0	1579	3536	102	25	1660	0	0	2011	0	0	0
Stylocheiron spp.	0	387	703	715	1246	2715	2082	187	946	1055	1175	474	2339	879	1800	5874
euphausiid larvae	2583	1516	2685	1141	1614	3378	3772	383	970	1308	568	492	3611	1039	762	2355
Total	3007	8080	6394	1864	2876	7704	9548	672	1941	4249	1750	1015	8617	2071	2700	8340

	Stations															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	total
Thysanopoda tricuspidata	106	198	247	90	163	109	0	348	98	91	42	10	184	52	4	2371
Euphausiacea spp.	0	963	953	2	0	2258	8257	63	5067	0	0	20	0	0	13	17699
Stylocheiron spp.	908	1902	1129	225	1376	3210	2524	1774	1673	219	245	123	568	736	1430	22578
euphausiid larvae	536	3755	2681	183	744	2068	6416	3927	6986	337	423	884	738	563	444	28179
Total	1550	6818	5010	500	2283	7645	17197	6113	13824	647	710	1036	1490	1351	1891	70827

families: Palinuridae and Scyllaridae. The family Palinuridae was represented by *Panulirus* spp. This species was found at three stations in few number (2-3 individual/1000m^3). *Scyllarus* spp. of the family Scyllaridae was found in small numbers at 8 station ranging from 1-44 individual/1000m^3. The highest concentration of these larvae was at station 16 (Table 6). This group formed 0% - 0.2% of all groups at different stations (Table 10).

Brachyura

Larvae of fourteen brachyuran families were identified. A total of 9,303 individual/1000m^3 brachyuran larvae was record in this survey forming 4.3 % of the total larvae recorded. Only one larvae of Dromiidae were found at station 17. The larvae of Homolidae were found at three stations. The highest density was at station 16 with 29 individual/1000m^3. Dorippidae larvae occurred at three stations, number ranging from 6-29 individual/1000m^3. Larvae of Calappidae were presented in some stations in small numbers with the range 1-8 individual/1000m^3. The larvae of Leucosiidae were also found in some station. The highest density was found at station 16 with 103 individual/1000m^3. Raninidae larvae appeared in many stations, the highest density was at station 25 with 35 individual/1000m^3. Majidae larvae appeared in many stations. The highest concentration was at station 16 with 147 individual/1000m^3. Parthenopidae larvae appeared in some stations, the highest concentration was at station 24 with 160 individual/1000m^3. Hymenosomatidae larvae were found in many stations. The highest density was 1,921 individual/1000m^3 at station 16. Small number of Corystidae larvae were recorded in many stations. The highest density was found at station 24 with 102 individual/1000m^3. The genus Cancer of the family Cancridae occurred in some stations, the highest density was at station 16 with 29 individual/1000m^3. The genus *Portunus* of the family Portunidae was represented in most stations. The highest density was found at station 23 with 1,701 individual/1000m^3. Xanthidae larvae were common. The highest density was found at station 16 with 704 individual/1000m^3. Grapsidae larvae also occurred in some stations, the highest density was at station 24 with 36 individual/

Table 4 Numbers of Penaeidea larvae per 1000 m^3 at 31 stations in the western Philippines water, during 7 April – 19 May 1998 .

	Stations															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Fam. Soleniceridae																
Solenocera spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270
Fam. Aristeidae																
Gennadas spp.	48	35	9	12	35	48	56	51	21	38	16	25	76	35	59	216
Fam. Penaeidae																
Protozoea stage	10	2	0	0	0	0	0	6	0	25	7	0	0	2	0	0
Penaeus spp.	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parapenaeus spp.	2	16	10	0	0	10	2	0	0	0	0	5	6	0	2	216
Fam. Sergestidae																
Sergestes spp.	104	88	87	38	374	142	177	79	128	97	30	89	63	38	68	72
Sergia spp.	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0
Lucifer spp.	3753	850	1719	961	2091	1943	4388	964	491	1429	357	2742	1177	757	748	4075
Total	7660	1840	3542	1971	4591	4088	9014	2057	1132	2992	761	5603	2499	1587	1624	8926

	Stations															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
Fam. Solenoceridae																
Solenocera spp.	0	0	0	0	0	3	5	0	0	0	0	18	0	0	6	270
Fam. Aristeidae																
Gennadas spp.	11	0	4	20	19	20	44	35	22	8	21	13	20	4	16	781
Fam. Penaeidae																
Protozoea stage	15	0	6	0	0	0	0	0	0	0	0	0	1	8	0	51
Penaeus spp.	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	2
Parapenaeus spp.	36	82	34	26	37	90	143	69	54	14	52	0	23	24	43	2401
Sergestes spp.	36	82	34	26	37	90	143	69	54	14	52	0	23	24	43	1674
Sergia spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Lucifer spp.	1001	374	1064	463	781	1107	2397	750	439	686	2270	251	1419	416	292	42154
Total	2055	831	2167	972	1618	2334	5038	1617	972	1400	4617	539	2886	869	654	88458

1000m^3. The highest concentration of Brachyura larvae was station 16, with 3563 individual/ 1000m^3 (Table 7). This group formed 0% - 22.1% of all groups at different stations (Table 10).

Stomatopoda

Stomatopoda was composed of three families: Lysiosquillidae, Squillidae, and Gonodactylidae. Family Lysiosquillidae was represented by *Lysiosquilla* spp. They were rare that the highest density was at station 23 with 28 individual/1000m^3. Family Squillidae was represented by *Squilla* spp. They were common. The highest density was at station 16 with 352 individual/1000m^3. Family Gonodactylidae was express by *Gonodactylus* spp. which appeared in six stations. . The highest density was observed at station 23 with 28 individual/1000m^3. The highest concentration of Stomatopoda larvae was observed at station 16, with 398 individual/ 1000m^3 (Table 8). This group formed 0% - 1.4 % of all groups at different stations (Table 10).

Table 5 Numbers of Caridea larvae per 1000 m^3 at 31 stations in the western Philippines water, during 7 April-19 May 1998.

	Stations															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Pasiphaeidae																
Leptochela spp.	2	28	13	2	5	3	35	0	2	0	2	2	0	0	3	399
Oplophoridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nematocarcinidae	2	4	3	2	5	3	35	0	2	0	2	0	0	0	0	36
Rhynchocinetidae	2	0	0	0	2	2	0	0	0	2	0	5	6	0	17	18
Rhynchocinetes spp.																
Anchistioididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anchistioides spp.																
Palaemoninae	6	12	20	0	4	7	2	0	12	6	2	10	13	13	12	992
Palaemonites sp. 1	0	0	0	0	0	0	0	0	0	4	2	0	3	0	3	0
Palaemonites sp. 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retrocaris spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Palaemonid sp. 1	2	0	1	0	0	0	0	0	0	0	0	0	0	2	2	18
Palaemonid sp. 2	4	12	19	0	4	7	2	0	12	2	0	10	9	11	7	974
Palaemonid sp. 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pontoniinae	0	150	72	2	7	0	5	0	10	13	19	10	73	18	19	4165
Pontanid sp. 1	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mesocaris spp.	0	18	9	0	2	0	0	0	2	2	0	0	13	3	7	72
Periclimenes spp.	0	122	63	2	5	0	5	0	8	11	19	10	60	14	12	4093
Alpheidae	12	213	170	10	4	5	2	3	19	13	9	36	127	11	42	3029
Alpheus sp. 1	0	30	6	0	2	0	0	0	6	4	0	2	3	0	0	0
Alpheus sp. 2	12	180	156	10	2	3	2	3	14	8	9	35	120	11	41	3029
Alpheus sp. 3	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0
Alpheus sp. 4	0	2	4	0	0	2	0	0	0	0	0	0	0	0	0	0
Alpheus sp. 5	0	2	3	0	0	0	0	0	0	0	0	0	0	0	2	0
Processidae	2	2	1	0	0	0	0	0	0	0	0	0	3	0	0	0
Hippolytidae																
Lysmata spp.	0	4	1	0	0	0	0	0	0	0	0	3	0	2	2	343
Pandalidae	0	0	1	0	0	3	2	0	0	2	0	2	0	0	2	180
Heterocarpus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plesionika spp.	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	180
Stylopandalus spp.	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Pandalid sp. 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pandalid sp. 2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Pandalid sp. 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pandalid sp. 4	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0
Pandalid sp.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thalassocarididae																
Thalassocaris spp.	12	14	9	6	2	0	2	0	6	8	9	7	19	3	25	974
Amphionidae																
Amphion spp.	15	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0
caridean sp. 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
caridean sp. 2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Total	52	428	291	22	29	24	87	3	50	44	44	74	240	46	123	10154

Table 5 Continued

	Stations															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
Pasiphaeidae																
Leptochela spp.	4	8	0	2	2	5	966	45	811	6	0	119	1	10	806	3283
Oplophoridae	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
Nematocarcinidae	3	8	0	2	2	0	0	0	5	4	0	3	1	0	14	95
Rhynchocinetidae																
Rhynchocinetes spp.	1	5	4	0	0	0	15	5	3	2	4	5	0	18	12	54
Anchistioididae																
Anchistioides spp.	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Palaemoninae	8	27	4	0	8	28	69	5	35	24	9	23	8	34	43	1435
Palaemonites sp. 1	0	24	0	0	0	8	0	0	3	20	4	0	0	0	0	13
Palaemonites sp. 2	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Retrocaris spp.	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Palaemonid sp. 1	0	0	0	0	8	10	30	4	3	2	0	5	4	14	29	25
Palaemonid sp. 2	7	3	4	0	0	10	34	2	27	0	5	18	4	20	14	1073
Palaemonid sp. 3	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Pontoniinae	28	74	4	15	16	20	976	309	59	18	11	168	30	246	298	6834
Pontanid sp. 1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	11
Mesocaris spp.	9	64	2	0	2	3	69	7	3	0	0	8	1	24	19	127
Periclimenes spp.	19	11	2	13	14	18	907	302	57	18	11	161	29	222	279	4423
Alpheidae	28	11	13	7	10	49	1261	306	89	39	23	119	52	296	212	6220
Alpheus sp. 1	1	0	0	0	0	3	10	2	5	0	0	0	3	46	0	52
Alpheus sp. 2	27	11	13	7	10	46	1252	302	84	39	20	117	46	248	197	3635
Alpheus sp. 3	0	0	0	0	0	0	0	2	0	0	4	0	0	0	6	5
Alpheus sp. 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	8
Alpheus sp. 5	0	0	0	0	0	0	0	0	0	0	0	3	3	2	4	6
Processidae	1	0	2	4	2	0	0	0	0	0	2	0	1	2	0	23
Hippolytidae																
Lysmata spp.	1	0	0	4	3	0	15	7	3	2	4	5	0	8	8	354
Pandalidae	0	0	0	2	0	0	5	0	5	0	4	8	0	0	8	225
Heterocarpus spp.	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Plesionika spp.	0	0	0	0	0	0	5	0	0	0	2	5	0	0	8	184
Stylopandalus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Pandalid sp. 1	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0
Pandalid sp. 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Pandalid sp. 3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Pandalid sp. 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Pandalid sp.5	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Thalassocarididae																
Thalassocaris spp.	7	8	28	24	37	8	103	131	40	18	63	18	38	218	119	1096
Amphionidae																
Amphion spp.	0	3	2	0	5	0	0	2	0	2	5	0	7	0	0	19
caridean sp. 1	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2	18
caridean sp. 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	82	143	58	62	83	113	3410	811	1054	114	123	472	139	830	1521	20728

Table 6 Numbers of Macruma (Reptantia) larvae per 1000 m^3 at 31 stations in the western Philippines water, during 7 April – 19 May 1998.

	Stations															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Stenopidea																
Stenopus spp.	4	11	9	0	2	9	0	0	0	4	0	3	6	2	5	72
Thalassinidea																
Thalassinid larvae	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0
Palinuridae																
Panulirus spp.	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scyllaridae																
Scyllarus spp.	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	44
Total	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	44

	Stations															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
Stenopidea																
Stenopus spp.	1	3	0	0	8	5	39	18	13	2	4	13	3	2	27	265
Thalassinidea																
Thalassinid larvae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Palinuridae																
Panulirus spp.	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0	6
Scyllaridae																
Scyllarus spp.	0	0	0	0	0	0	7	0	0	0	0	5	0	0	2	61
Total	0	3	0	0	0	0	7	0	0	0	2	5	0	0	2	67

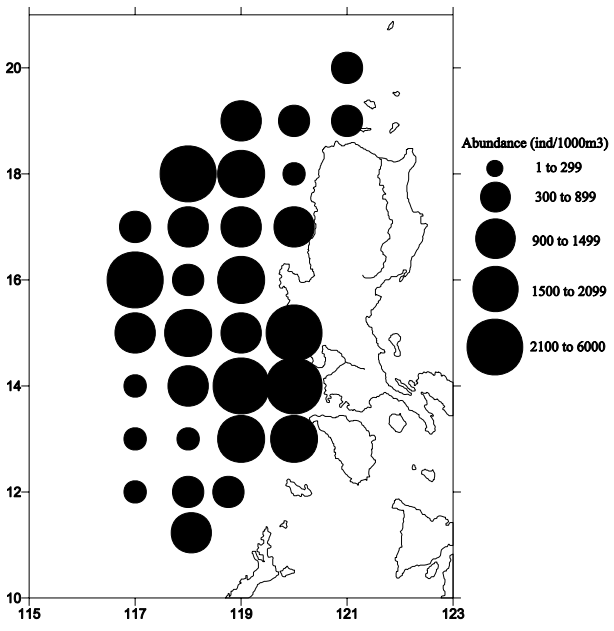

Fig. 8. Distribution and abundance of *Stylocheiron* sp. in the western Philippines.

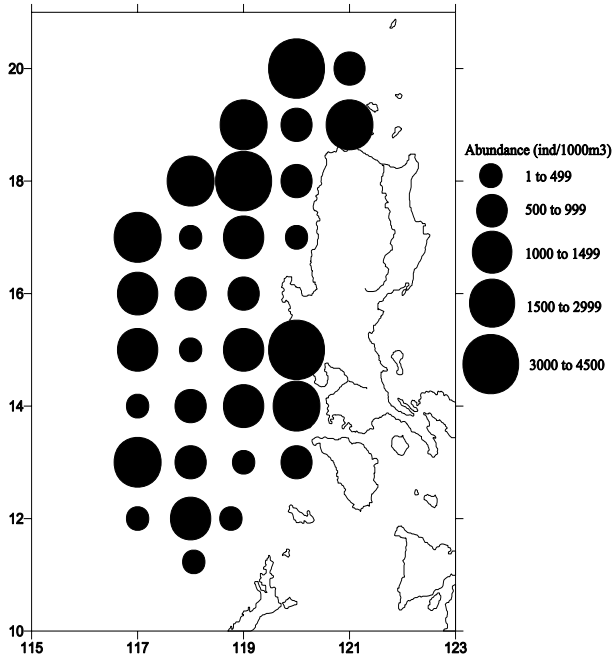

Fig. 9. Distribution and abundance of *Lucifer* sp. in the western Philippines.

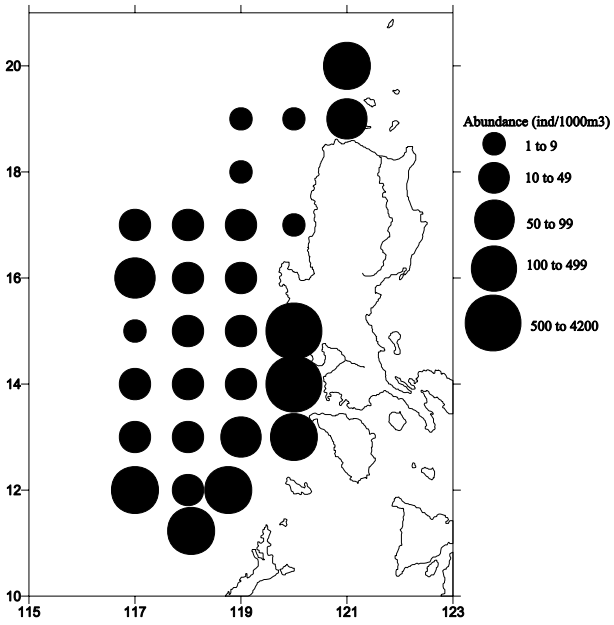

Fig. 10. Distribution and abundance of *Periclimenes* sp. in the western Philippines.

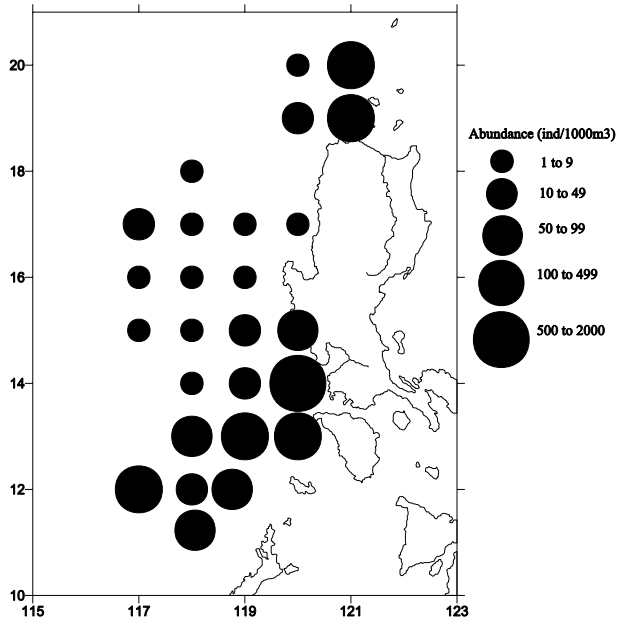

Fig. 11. Distribution and abundance of *Portunus* sp. in the western Phiippines.

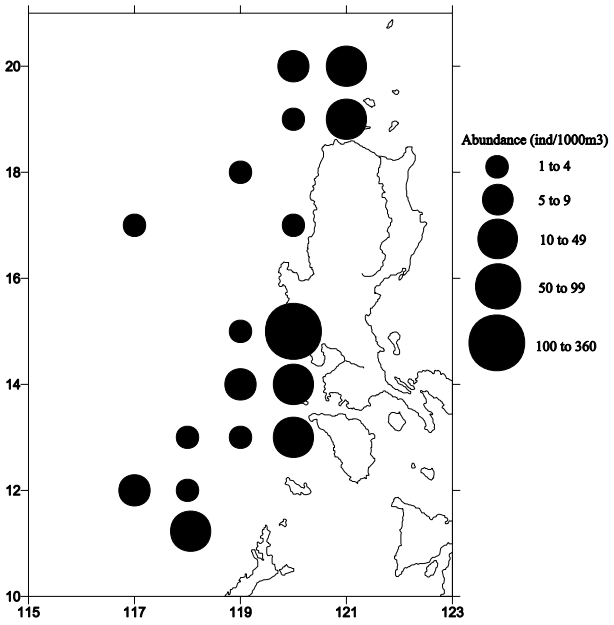

Fig. 12. Distribution and abundance of *Squilla* sp. in the western Philippines.

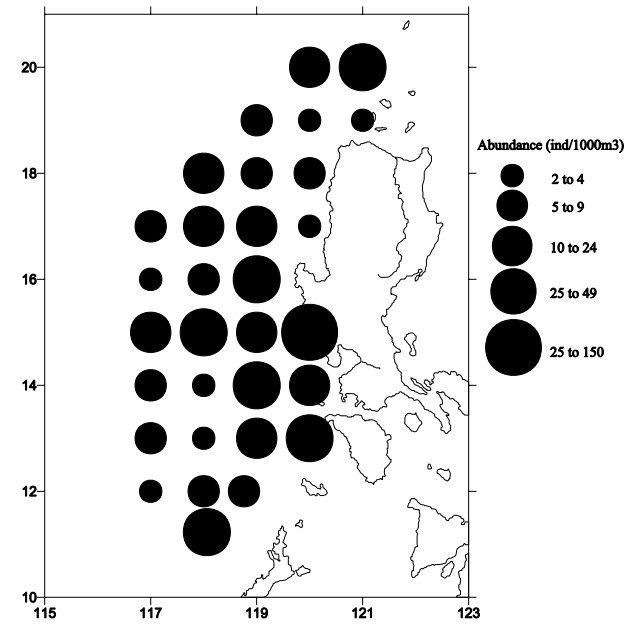

Fig.13.Distribution and abundance of *Enoploteuthis* sp. in the western Philippines.

Table 7 Numbers of Brachyura larvae per 1000 m^3 at 31 stations in the western Philippines water, during 7 April – 19 May 1998.

	Stations																															
St.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**Total**
Dromiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Homolidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	6	7	0	0	0	0	0	0	0	43
Dorippidae	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	29	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	42
Calappidae	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	4	0	0	0	0	7	8	0	0	5	0	2	0	30
Leucosiidae	0	5	3	0	0	0	0	0	0	0	0	0	0	0	0	103	0	0	0	0	0	0	6	15	5	0	0	3	4	2	4	149
Raninidae	4	2	1	2	0	3	7	11	6	0	0	13	9	0	2	0	1	0	6	2	0	0	6	22	35	12	2	5	0	6	0	159
Majidae	0	23	20	0	0	0	0	0	0	0	0	2	3	0	2	147	3	3	2	2	2	0	98	62	3	6	2	39	8	8	8	441
Parthenopidae	0	9	19	0	0	0	0	0	0	0	0	2	0	0	0	117	0	0	0	0	0	0	0	160	0	0	0	0	0	14	8	328
Hymenosomatidae	2	14	26	0	0	3	0	3	0	0	0	0	0	0	0	1921	0	0	0	0	0	5	104	152	8	0	0	18	0	4	10	2271
Corystidae	0	11	17	0	0	0	0	3	0	0	0	2	13	0	3	0	0	0	2	0	0	0	31	102	22	6	2	5	0	6	10	233
Crancridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	12	0	3	0	0	3	1	0	0	48
Portunidae	2	122	232	12	0	2	0	0	6	6	7	15	9	2	2	88	36	8	4	0	5	26	1701	279	148	88	0	350	46	79	92	3367
Xanthidae	0	16	6	2	0	5	2	0	2	29	2	3	3	2	7	704	12	5	9	2	2	8	209	40	24	0	2	80	8	44	21	1249
Grapsidae	0	5	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	0	3	0	36	0	0	0	0	0	4	2	58
unknown sp. 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	0	0	0	0	0	0	0	10
unknown sp. 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	31	11	0	0	0	0	0	0	0	71
unknown sp. 3	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	29	1	0	0	0	0	0	6	0	0	2	0	0	0	0	0	42
unknown sp . 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
unknown sp . 5	0	2	0	0	0	0	0	0	0	0	0	0	9	0	0	147	0	0	2	0	0	0	18	4	0	0	0	0	0	0	8	190
unknown sp . 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	3	0	2	2	15
Megalop sp. 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Megalop sp. 2	0	12	3	0	2	0	0	0	2	4	0	5	3	2	7	44	0	0	11	2	0	8	37	22	22	14	4	8	1	2	0	213
Megalop sp. 3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Megalop sp. 4	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	5	12	11	5	0	0	0	0	2	0	40
Megalop sp. 5	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	25	0	3	2	0	0	0	4	0	35
Megalop sp. 6	0	2	9	0	0	0	0	0	0	0	0	0	0	0	0	103	1	0	0	0	0	0	43	15	0	0	0	0	1	2	6	181
Megalop sp. 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	12
Megalop sp. 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Megalop sp. 9	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	5
Megalop sp. 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	2	8	17
Megalop sp. 11	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
Total	8	227	336	18	2	14	9	17	17	42	9	55	54	5	24	3563	59	16	45	9	8	54	2371	957	294	129	11	518	71	182	179	9303

Table 8 Numbers of Stomapoda larvae per 1000 m^3 at 31 stations in the western Philippines water. During 7 April – 19 May 1998

	Stations															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Lysiosquillidae																
Lysiosquilla sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
Lysiosquilld sp. 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Lysiosquilld sp. 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Squillidae																
Squilla spp.	6	46	27	2	0	0	2	0	2	0	0	2	0	0	2	352
Gonodactylidae																
Gonodactylus spp.	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Stomatopod sp.1	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Stomatopod sp. 2	0	0	1	0	0	2	0	3	0	0	0	2	0	0	2	0
Stomatopod sp. 3	2	11	12	0	0	0	0	3	0	0	0	2	9	0	2	2
Total	8	58	40	4	0	2	2	6	2	0	0	5	9	0	5	398

	Stations															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
Lysiosquillidae																
Lysiosquilla sp.	0	0	0	0	0	0	28	16	0	0	0	0	0	0	0	61
Lysiosquilld sp. 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Lysiosquilld sp. 2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Squillidae																
Squilla spp.	3	0	0	0	0	8	39	33	3	2	0	5	1	0	16	550
Gonodactylidae																
Gonodactylus spp.	0	0	0	0	0	0	28	20	0	0	0	2	0	0	4	65
Stomatopod sp. 1	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	12
Stomatopod sp. 2	0	3	2	0	0	3	2	5	5	0	0	0	1	0	10	41
Stomatopod sp. 3	4	0	2	0	3	3	2	5	5	6	0	0	0	0	0	72
Total	7	3	9	0	3	13	104	80	13	8	0	5	3	0	25	812

Cephalopoda

Paralarvae of six cephalopoda families were identified: Enoploteuthidae, Ommastrepidae, Onychoteuthidae, Brachioteuthidae, Cranchidae and Octopodidae. The family Enoploteuthidae was represented by *Enoploteuthis* spp. and *Abralia* spp. *Enoploteuthis* spp. was found all over the area, ranging from 2-137 individual/1000m^3, that highest density was observed at stations 16. While *Abralia* spp. occurred only at one station (St. 7) with 2 individual/1000m^3. The family Ommastrepidae was expressed by *Sthenoteuthis oualaniensis.* The paralarvae of *Sthenoteuthis oualaniensis* was found at almost every station except station 16 and 28. The highest density was observed at station 10 with 55 individual/1000m^3. *Onychoteuthis* spp. of the family Onychoteuthidae was very rare found at only two stations (4 individual/1000m^3). The family

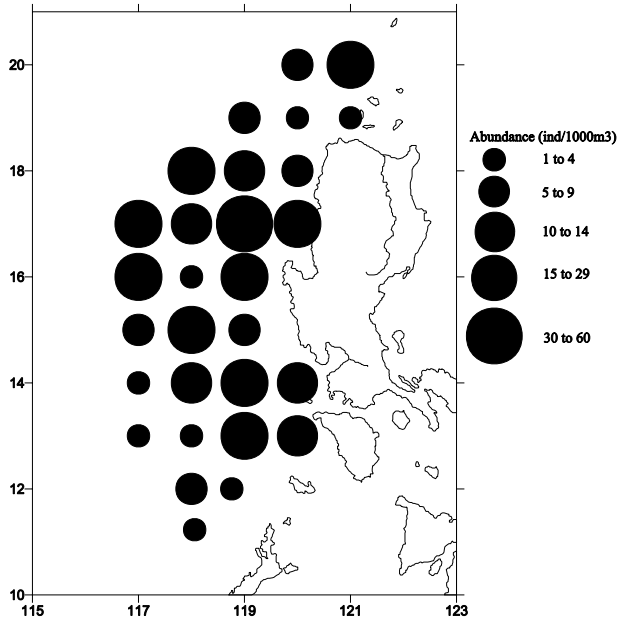

Fig. 14. Distribution and abundance of *Sthenoteuthis oualaniensis* in the western Philippines.

Table 9. Numbers of Cephalopod paralarvae per 1000 m^3 at 31 stations in the western Philippines water, during 7 April- 19 May 1998.

	Stations															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Enoploteuthidae																
Enoploteuthis spp.	10	44	4	4	7	10	5	6	2	19	19	8	3	5	25	137
Abralia spp.	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Ommastrepidae																
Stenoteuthis oualaniensis	6	16	3	2	7	22	14	6	17	55	12	20	22	3	19	0
Onychoteuthidae																
Onychoteuthis spp.	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
Brachioteuthidae																
Brachioteuthis spp.	6	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0
Cranchidae																
Leachia spp.	0	0	0	2	0	0	0	0	2	0	2	0	0	0	3	0
Liocranchia spp.	0	0	0	2	2	0	5	0	2	0	2	0	0	0	0	2
Octopodidae																
Octopus type I	0	2	0	0	0	0	0	3	2	0	2	0	6	0	0	5
Octopus type II	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Octopus type III	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Octopus type IV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown cephalopod sp. 1	0	5	0	0	7	9	0	3	2	0	2	5	0	2	12	0
Total	21	67	7	10	27	41	28	20	27	74	39	33	32	10	59	148

Table 9 (continued)

	Stations															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	total
Enoploteuthidae																
Enoploteuthis spp.	13	37	11	7	3	28	22	38	11	4	7	3	5	8	29	534
Abralia spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Ommastrepidae																
Stenoteuthis oualaniensis	5	24	6	2	11	15	13	11	16	4	2	0	5	2	2	343
Onychoteuthidae																
Onychoteuthis spp.	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	5
Brachioteuthidae																
Brachioteuthis spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Cranchidae																
Leachia spp.	0	0	2	0	5	3	15	0	0	0	0	0	4	2	0	40
Liocranchia spp.	0	0	0	0	6	0	0	0	0	0	0	0	1	2	0	24
Octopodidae																
Octopus type I	3	0	2	0	2	5	4	5	0	0	0	0	1	2	0	45
Octopus type II	0	0	0	0	0	3	4	0	0	0	0	0	0	0	0	9
Octopus type III	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Octopus type IV	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Unknown cephalopod sp.1	1	0	0	0	3	0	0	0	0	0	0	0	3	0	2	56
Total	23	61	21	9	30	54	59	58	27	8	9	3	20	16	33	1074

Table 10 Composition and percent abundance of important groups of malacostraca and cephalopod paralarvae recorded at each station during 7 April – 19 May 1998.

Station	Euphausiacea	Penaeidae	Caridea	Stenopidea	Thalassinidea	Parinuridea	Brachyura	Stomatopoda	Cephalopod
1	3007(42.9%)	3907(55.7%)	52 (0.7%)	4 (0.1%)	0	2 (0%)	8 (0.1%)	8 (0.1%)	21 (0.3%)
2	8080 (81.9%)	991 (10.0%)	428 (4.3%)	11 (0.1%)	0	2 (0%)	227 (2.3%)	58 (0.6%)	67 (0.7%)
3	6394 (71.8%)	1824 (20.5%)	291 (3.3%)	9 (0.1%)	1 (0%)	1 (0%)	336 (3.8%)	40 (0.4%)	7 (0.1%)
4	1864 (63.7%)	1010 (34.5%)	22 (0.8%)	0	0	0	18 (0.6%)	4 (0.1%)	10 (0.3%)
5	2876 (52.9%)	2500 (46.0%)	29 (0.5%)	2 (0%)	0	0	2 (0%)	0	27 (0.5%)
6	7704 (77.5%)	2145 (21.6%)	24 (0.2%)	9 (0.1%)	0	0	14(0.1%)	2	41 (0.4%)
7	9548 (66.8%)	87 (0.6%)	4626 (32.3%)	0	0	0	9 (0.1%)	2 (0%)	28 (0.2%)
8	672 (37.1%)	1094 (60.4%)	3 (0.2%)	0	0	0	17 (0.9%)	6 (0.3%)	20 (1.1%)
9	1941 (72.5%)	640 (23.9%)	50 (1.9%)	0	0	0	17 (0.6%)	2 (0.1%)	27 (1.0%)
10	4249(71.1%)	1564 (26.2%)	44 (0.7%)	4 (0.1%)	0	0	42 (0.7%)	0	74 (1.2%)
11	1750 (77.9%)	404 (18.0%)	44 (2.0%)	0	0	0	9 (0.4%)	0	39 (1.7%)
12	1015 (25.1%)	2861 (70.7%)	74 (1.8%)	3 (0.1%)	2 (0%)	0	55 (1.4%)	5 (0.1%)	33 (0.8%)
13	8617 (83.8%)	1322 (12.9%)	240 (2.3%)	6 (0.1%)	0	0	54 (0.5%)	9 (0.1%)	32 (0.3%)
14	2071 (69.9%)	830 (28.0%)	46 (1.6%)	2 (0.1%)	0	0	5 (0.2%)	0	10 (0.3%)
15	2700 (71.2%)	876 (23.1%)	123 (3.2%)	5 (0.1%)	0	0	24 (0.6%)	5 (0.1%)	59 (1.6%)
16	8340 (30.3%)	4851 (17.6%)	10154 (36.8%)	72 (0.3%)	0	44 (0.2%)	3563 (12.9%)	398 (1.4%)	148 (0.5%)
17	1550 (55.8%)	1054 (38.0%)	82 (3.0%)	1 (0%)	0	0	59 (2.1%)	7 (0.3%)	23 (0.8%)
18	6818 (90.9%)	457 (6.1%)	143 (1.9%)	3 (0%)	0	3 (0%)	16 (0.2%)	3 (0%)	61 (0.8%)
19	5010 (80.2%)	1103 (17.7%)	58 (0.9%)	0	0	0	45 (0.7%)	9 (0.1%)	21 (0.3%)
20	500 (45.9%)	509 (46.7%)	62 (5.7%)	0	0	0	9 (0.8%)	0	9 (0.8%)
21	2283 (70.2%)	837 (25.7%)	83 (2.6%)	8 (0.2%)	0	0	8 (0.2%)	3 (0.1%)	30 (0.9%)
22	7645 (83.9%)	1227 (13.5%)	113 (1.2%)	5 (0.1%)	0	0	54 (0.6%)	13 (0.1%)	54 (0.6%)
23	17197(66.6%)	2641 (10.2%)	3410 (13.2%)	39 (0.2%)	0	7	2371 (9.2%)	104 (0.4%)	59 0.2%)
24	6113 (68.6%)	868 (9.7%)	811 (9.1%)	18 (0.2%)	0	0	957 (10.7%)	80 (0.9%)	58 (0.7%)
25	13824 (87.7%)	533 (3.4%)	1054 (6.7%)	13 (0.1%)	0	0	294 (1.9%)	13 (0.1%)	27 (0.2%)
26	647 (39.9%)	713 (44.0%)	114 (7.0%)	2 (0.1%)	0	0	129 (8.0%)	8 (0.5%)	8 (0.5%)
27	710 (22.1%)	2347 (73.2%)	123 (3.8%)	4 (0.1%)	0	2 (0.1%)	11 (0.3%)	0.00%	9 (0.3%)
28	1036 (44.3%)	288 (12.3%)	472 (20.2%)	13 (0.6%)	0	5 (0.2%)	518 (22.1%)	5 (0.2%)	3 (0.1%)
29	1490 (46.7%)	1467 (45.9%)	139 (4.4%)	3 (0.1%)	0	0	71 (2.2%)	3 (0.1%)	20 (0.6%)
30	1351 (64.7%)	454 (21.7%)	83 (4.0%)	2 (0.1%)	0	0	182 (8.7%)	0.00%	16 (0.8%)
31	1891 (46.8%)	362 (9.0%)	1521 (37.6%)	27 (0.7%)	0	2 (0%)	179 (4.4%)	25 (0.6%)	33 (0.8%)
Total	138893 (63.9%)	46304 (21.3%)	20728 (9.5%)	265 (0.1%)	3 (0%)	67 (0%)	9303 (4.3%)	812 (0.4%)	1074 (0.5%)

Brachioteuthidae was represented by *Brachioteuthis* spp. It occurred at three stations, ranging from 2-6 individual/1000m^3. The family Cranchidae was expressed by *Liocranchia* sp. and *Leachia* spp. Both of them were appeared only in few stations. The highest density of *Liocranchia* spp. was at station 21 with 6 individual/1000m^3. The highest density of *Leachia* spp. was 15 individual/1000m^3 at station 23. The family Octopodidae was represented by *Octopus* type I-IV. This families was not common and was found in few number (0-12 individual/1000m^3). The highest concentration of Cephalopod paralarvae was found at station 16, with 1480 individual/ 1000m^3 (Table 9). This group formed 0.1% - 1.7 % of all groups at different stations (Table 10).

Discussion

The highest density of malacostraca larvae and cephalopod paralarvae was found at station 16 related to high density of shrimp larvae, phyllosoma larvae, brachyura larvae, stomatopoda larvae and cephalopod paralarvae. Whereas Euphausiacea appeared in highest density at station 23. This studied found some economic species such as *Penaeus* spp., *Parapenaeus* spp., *Panulirus* spp., *Scyllarus* spp., *Portunus* spp. and *Sthenoteuthis oualaniensis*. Moto (1986) reported some edible crustacean in the Philippines waters that most of them were found in inshore water where the depth was not more than 300 meters. Roper *et al* (1984) reported cephalopod of the world. He found 10 families and at least 25 species from the Philippines waters. In this study, 6 families and 11 species of cephalopod paralarvae were found. Holthuis (1980) reported shrimps and prawn of the world, he found 7 families and at least 20 species in this area. In this study, there were found shrimp larvae 16 families and 37 species. Holthuis (1991) also reported marine lobsters of the world, he found 24 species in the Philippines waters. In this study, 2 families and 2 species of phyllosoma larvae were reported. This investigation is the first study in quantitative and qualitative study of malacostraca larvae and cephalopod paralarvae in this area. It provides a background information for future long term study. At least, the result will be of use for the investigation about the breeding period and spawning area of certain malacostraca and cephalopod in western Philippines water.

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